

## WHAT IS CLAIMED IS:

- 1        1.        An electron source comprising:  
2                a plurality of cold cathodes distributed on a substrate;  
3                a plurality of windows disposed within a support structure a predetermined  
4 distance from the substrate; and  
5                scanning electrodes for each of the plurality of cold cathodes, wherein the  
6 scanning electrodes are positioned so that each of the plurality of cold cathodes scans  
7 its electron beam to a plurality of the windows.
- 1        2.        The electron source as recited in claim 1, wherein the plurality of windows are  
2 positioned relative to each other in staggered rows.
- 1        3.        The electron source as recited in claim 2, wherein a first one of the staggered  
2 rows is staggered relative to a second one of the staggered rows.
- 1        4.        The electron source as recited in claim 2, wherein the plurality of windows  
2 enable a substantially uniform beam of electrons to be emitted from the electron  
3 source.
- 1        5.        The electron source as recited in claim 1, wherein the plurality of windows are  
2 configured to permit passage of the electron beams.
- 1        6.        The electron source as recited in claim 5, wherein the plurality of windows  
2 each comprise a foil film.

- 1        7.     An electron source comprising:  
2             a cold cathode;  
3             an evacuated vacuum envelope enclosing the cold cathode;  
4             circuitry for creating an electric field sufficient to cause an electron beam to be  
5 emitted from the cold cathode; and  
6             a window in the evacuated vacuum envelope to permit passage of the electron  
7 beam externally from the envelope.

1        8.        A method for operating an electron source, comprising the step of activating  
2        an electric field to cause an emission of an electron beam from a cold cathode within  
3        an evacuated envelope in a manner so that the electron beam passes externally from  
4        the envelope through a window in the envelope.

1        9.        The method as recited in claim 8, further comprising the step of positioning an  
2        object relative to the electron source so that the electron beam emitted externally from  
3        the electron source irradiates the object, wherein the object is external to the  
4        evacuated envelope.